

Evaluation of Multicast Routing Protocols for IP Networks

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The presented thesis deals with an important area of research in data communication networks such as routing protocols. In the work the protocols and mechanisms used to provide group-based communications over IP-based packet-switched networks have been discussed. Particular attention was paid to the multicast routing protocols, which form the main scope of research presented at the work. The thesis begins with a comprehensive discussion of the state of the art including the Multicast IP model and the overview of the multicast routing protocols developed for IP networks, such as DVMRP, H-DVMRP, MOSPF, CBT, PIM-DM, PIM-SM, PIM-SSM, Bidirectional or Hierarchical PIM. The following chapters show the routing protocols used in production networks, with particular reference to the PIM protocols. The following chapters describe the proposal of the new Lightweight Protocol Independent Multicast and results of the comprehensive simulation of the multicast routing protocols.

The main purpose of the thesis was to propose a new multicast routing protocol that would be distinguished by the smaller complexity of the control plane from the existing solutions. Therefore, it will be less burdensome for network nodes (routers), so that services using group communications will be offered users located in larger networks or on networks with nodes of fewer resources. By analyzing the results of the simulation research, it can be stated that this goal was reached by the author of the work. The second, albeit slightly less important, objective was to conduct a broad range of comparative studies of existing multicast routing protocols. This goal has also been achieved, and the scope of simulation studies conducted by the author do not find counterparts in the literature of the subject.